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Thirty-Fourth Annual Report

OF THE

Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

Auburn, Alabama

January, 1924

ALABAMA POLYTECHNIC INSTITUTE

Auburn, Ala., Dec. 7, 1923.

Gov. W. W. Brandon,
State Capitol Building,
Montgomery, Alabama.

Dear Sir:

In accordance with an Act of Congress, approved March 21, 1887, establishing Agricultural Experiment Stations and an Act of Congress approved March 16, 1906, known as the Adams Act, I herewith transmit to you the Thirty-fourth Annual Report of the Agricultural Experiment Station of the Alabama Polytechnic Institute.

Respectfully,
SPRIGHT DOWELL,
President.

Auburn, Ala., Sept. 1, 1923.

President Spright Dowell,
Auburn, Alabama.

Dear Dr. Dowell:

I am handing you herewith the 34th Annual Report of the Alabama Experiment Station, Alabama Polytechnic Institute, for the fiscal year ending June 30, 1923.

Yours very truly,
DAN T. GRAY,
Dean and Director.

TRUSTEES

His Excellency, William W. Brandon, President ---Ex-Officio

J. W. Abercrombie, Superintendent of Education --Ex-Officio

TERM EXPIRES 1927

C. S. McDowell, Jr., Third District ----------Eufaula

Victor Hanson, Ninth District ----------Birmingham

W. H. Oats, First District ----------Mobile

T. D. Samford, Third District ----------Opelika

P. S. Haley, Tenth District ----------Oakman

TERM EXPIRES 1931

H. D. Merrill, Fourth District ----------Anniston

Harry Herzfeld, Fifth District ----------Alexander City

Oliver R. Hood, Seventh District ----------Gadsden

TERM EXPIRES 1935

Charles Henderson, Second District ----------Troy

J. A. Rogers, Sixth District ----------Gainesville

C. M. Sherrod, Eighth District ----------Courtland

EXPERIMENT STATION STAFF

SPRIGHT DOWELL, A. M., LL. D., President

DAN T. GRAY, A. B., M. S., Director of Experiment Station

J. P. BELL, Secretary

AGRICULTURAL ECONOMY

J. F. Duggar, M. S., Agricultural Economist

AGRICULTURAL ENGINEERING

M. L. Nichols, M. S., Agricultural Engineer
J. W. Randolph, B. S., Assistant Agricultural Engineer
E. C. Easter, B. S., Assistant Agricultural Engineer

AGRONOMY

M. J. Funchess, M. S., Agronomist
F. W. Parker, Ph. D., Soils Chemist
J. T. Williamson, B. S., Associate Agronomist
H. B. Tisdale, B. S., Associate Plant Breeder
H. B. Helms, B. S., Assistant in Agronomy
W. H. Appleton, B. S., Assistant in Agronomy

ANIMAL INDUSTRY

J. C. Grimes, M. S., Animal Husbandman
W. H. Eaton, B. S., Dairyman
W. D. Salmon, M. S., Assistant Animal Husbandman

BOTANY AND PLANT PATHOLOGY

W. A. Gardner, A. M., Ph. D., Botanist
C. C. Zeliff, M. S., Associate Botanist
L. E. Miles, A. B., Ph. D., Associate Plant Pathologist
Martin Palmer, B. S., Assistant in Botany

CHEMISTRY

E. R. Miller, Ph. D., Research Chemist
M. A. Barnes, B. S., Assistant Research Chemist

ENTOMOLOGY

W. E. Hinds, Ph. D., Entomologist
F. L. Thomas, Ph. D., Associate Entomologist
F. E. Guyton, B. S., M. S., Assistant Entomologist

HORTICULTURE

----------, Horticulturist
C. L. Isbell, M. S., Associate Horticulturist
O. Brown, M. S., Assistant Horticulturist
S. H. Gibbons, Assistant in Horticulture

VETERINARY SCIENCE

C. A. Cary, B. S., D. V. M., Veterinarian

AGRICULTURAL EDITOR

P. O. Davis, B. S., Agricultural Editor

REPORT OF EXPERIMENT STATION FUNDS— DISBURSEMENTS

1922-1923

FINANCIAL REPORT

	Hatch	Adams	L. E.	Inv. A.	Farm S.
Salaries	$ 9,294.68	$10,966.66	$16,354.09	$4,880.82	$ 750.00
Labor	1,228.15	830.94	727.59	910.86	1,026.06
Publications	513.20				
Postage and Stat.	370.00	27.70	411.43	102.76	170.42
Freight and Exp.	106.40	77.65	757.61	235.45	307.74
Heat, Light, etc.				5.85	
Chemicals	187.67	768.01	53.48	73.55	94.91
Seeds, Plants, etc.	342.58	262.43	1,382.34	143.09	552.95
Fertilizers	357.89		288.84	42.50	741.47
Feed Stuff	554.87	139.10		259.45	208.65
Library	346.42	123.41		37.10	2.00
Tools, Mchy, etc.	202.03	141.89	173.60	145.00	745.60
Furniture & Fix.	234.03	8.50	62.88	19.70	185.57
Scientific App.	346.46	949.13	237.18		
Live Stock	669.10	244.00	30.00	6.50	490.00
Traveling Exp.	133.80	125.90	3,880.36	52.01	1,197.22
Contingent Exp.	5.20		1,327.44	17.00	6.00
Bldg. and Land	107.52	334.68	29.73	1,926.20	772.50
Totals	$15,000.00	$15,000.00	$25,716.57	$8,857.84	$7,251.09

State of Alabama,

Lee County.

Personally appeared before me, B. L. Shi, a Notary Public in and for said county, M. A. Glenn, known to me as Treasurer of the Alabama Polytechnic Institute, who, being duly sworn, deposes and says the above foregoing account is true and correct. Witness my hand this the 15th day of December, 1923.

B. L. SHI,

Notary Public, Lee County.

This is to certify that I have compared the account with the ledger account of the Treasurer, and this is a correct transcript of the same.

SPRIGHT DOWELL,

President, Alabama Polytechnic Institute.

PUBLICATIONS

Below are given the titles of our publications for the fiscal year ending June 30, 1923. Some of these publications have appeared in scientific magazines.

1. "Fertilizer Experiments with Cotton," Bulletin No. 219. By J. T. Williamson and M. J. Funchess.
2. "Tractor Situation in Alabama," Circular No. 46. By M. L. Nichols and J. W. Randolph.
3. "Results of Cotton Variety Tests," Circular No. 47. By Department of Agronomy.
4. "Life History and Control of Mexican Bean Beetle," Bulletin No. 220. By F. L. Thomas.
5. "Satsuma Curing or Precoloring." By Wright A. Gardner.
6. "A Modification of the Truog Soil Acidity Test." By F. W. Parker and J. W. Tidmore.
7. "Chemistry of the Velvet Bean." By E. R. Miller.
8. "Does the Velvet Bean Contain Vitamine B?" By E. R. Miller.
9. "Influence of Sodium Chloride on Elimination of Calcium and Phosphorus." By E. R. Miller.

Auburn, Ala., September 1, 1923.

Dr. Spright Dowell,
Auburn, labama.
Dear Dr. Dowell:

Since the farmers of Alabama have never had a statement showing the Experiment Station's research projects, I feel that they will be interested in a list of the agricultural problems being studied by those connected with the Alabama Experiment Station. It follows:

RESEARCH PROJECTS IN AGRONOMY DEPARTMENT

1. Sources of Nitrogen for Corn.
2. Rate of Seeding Peanuts.
3. Different Methods of Seeding Oats.
4. Climatic and Soil Effects upon Length of Cotton Fiber.
5. Varieties of Sorghum for Syrup.
6. Cotton Spacing.
7. System of Crop Rotation.
8. Time of Applying Nitrate of Soda to Corn.
9. Calcium Cynamid vs. Nitrate of Soda or Ammonium Sulphate as Fertilizer.

10. Comparison of Acid Phosphate vs. Raw Phosphate.
11. Time of Applying Nitrate of Soda to Cotton.
12. Crops Limed vs. Not Limed.
13. Sources of Nitrogen for Cotton.
14. Fall vs. Spring Planted Oats.
15. Cullers' Rotation of Crops (including tests of rock vs. acid phosphate).
16. Species of Clovers.
17. Vetch and Grain Mixture for Hay.
18. Plant Breeding: (a) Cotton; (b) Corn; (c) Wheat, oats; (d) Peanuts.
19. Rate of Seeding Sudan Grass and Cowpea Mixture for Hay.
20. Varieties of Sorghum for Forage.
21. Regular Variety Tests of Velvet Beans.
22. Regular Short Staple Cotton Variety Test.
23. Regular Soybean Varieties.
24. Late Planted Corn Variety Test.
25. Regular Oat Variety Test.
26. Variety Tests of Wheat.
27. Regular Cowpea Variety Test for Seed.
28. Regular Corn Variety Test.
29. Regular Variety of Rye.
30. Regular Fertilizer Experiment with Cotton.
31. Special Nitrate Experiment with Cotton (time of applying).
32. Extensive Variety Experiment with Cotton.
33. Sources of Phosphate: Experiment with Cotton, Corn, and Oats in Rotation, on four Different Fields.
34. Rate of Applying Fertilizers to Cotton.
35. Special Nitrate Experiment with Corn (time of applying).
36. Extensive Variety Experiment with Corn.
37. Velvet Bean Variety Experiment (short).
38. Fertilizer Rotation Experiment at Atmore, Jackson, Prattville, Cussetta, Sylacauga, and Hackleburg.
39. Extensive Winter Forage Experiment.
40. Medicago Variety Test (Including Melilotus).
41. Vetch Variety Experiment.

RESEARCH PROJECTS IN ENTOMOLOGY DEPARTMENT

1. The Pecan Weevil.
2. Turnip Web Worm.
3. Investigation of the Species Factor in Insect Control by Fumigation.
4. Cotton Dusting for Boll Weevil Control.
5. Satsuma Fruit Disenfestation and Cleaning.

RESEARCH PROJECTS IN DEPARTMENT OF AGRICULTURAL ENGINEERING

1. Soil Coefficient.
2. Preservation of Farm Timbers.
3. Air Cleaning.
4. Farm Buildings.
5. Seed-Gathering Machinery.
7. Destructional Distillation of Wood.
8. Land Clearing.
9. A Study of the Factors Influencing Traction of Wheel Tractors.

RESEARCH PROJECTS IN BOTANY AND PLANT PATHOLOGY

1. Brown Leaf-Spot of Pecans.
2. Sweet Potato Blackrot.
3. Soil Toxin.
4. Precoloring of Satsumas.
5. Sweet Potato.
6. Control of Pecan Scab by Means of Sprays.
7. Pecan Diseases.
8. Pecan Scab.

RESEARCH IN CHEMISTRY

1. Velvet Bean (to determine in what respect the velvet bean is deficient in nutritive proprieties, or is otherwise injurious).

RESEARCH PROJECTS IN HORTICULTURAL DEPARTMENT

1. Test to Determine the Fertilizer Needs of Different Vegetables.
2. Effect of Different Fertilizers on Satsuma Oranges.
3. Production of Sweet Potato Plants by two or more Fire Heated Bed Systems.
4. Vegetable Variety Tests.
5. Sweet Potato Variety Tests.
6. Variety Tests of Pears.
7. Sweet Potato Curing and Storage.
8. Variety Tests of Pecans.
9. Variety Tests of Peaches.
10. Variety Tests of Apples.
11. Fruit Variety Tests.

12. A Study of the Factors Associated with Varying Susceptibility to Nematode Injury, with Special Reference to the Members of the Jenus Prunus.
13. A Study of Fruit Buds, Differentation of Pecans, and Internal Changes Associated with the Process.

RESEARCH PROJECTS IN ANIMAL INDUSTRY DEPARTMENT

1. Cottonseed Meal Compared with Velvet Beans for Fattening Steers.
2. Velvet Beans for Feeder Pigs.
3. Velvet Beans for Brood Sows.
4. Peanuts vs. Peanut Meal for Hogs.
5. Peanuts as a Feed for Hogs.
6. Velvet Bean Meal vs. Wheat Bran as a Feed for Dairy Heifers.
7. Velvet Bean Meal vs. Wheat Bran as a Feed for Dairy Cattle.
8. Peanut Meal with Supplementary Feeds for Hogs.
9. The Value of Pastures for Milk and Butterfat Products.

RESEARCH PROJECTS IN VETERINARY DEPARTMENT

1. A Study of the Life History of Stephanurus Dentatus in and out of Swine, and in Connection therewith the Pathological Actions on Swine.
2. Study the Causes and Lesions of Swine that have Posterior Body and Lumbar Paralysis.
3. Investigate and Test the Action of Poisonous Plants.

To Alabamians:

The above list may seem to be long, and one which covers the field of agricultural research activities pretty completely. About a year ago, however, we had a committee of farmers studying our work and this list of research projects was submitted to them for study and recommendation. This committee of good practical farmers said:

"After a careful survey of the amount of work now being done by the Experiment Station, and an investigation of the funds allotted for use in the Experiment Station work, we are frankly amazed at the large amount of work done and the splendid results accomplished, with the meagre funds available. We find for example that the Mississippi A. & M. College, our next-door neighbor, has three times the funds

we have for Experiment Station work. No other state in the South is so badly crippled as Alabama on account of lack of funds for this purpose.

"The average appropriation for the Southern Experiment Station is 62 percent more than ours.

"All the other agricultural colleges of the South adopted long ago the substation system of studying local farm problems.

"Our College of Agriculture, including the campus, buildings, Experiment Station, etc., has a total of only 360 acres of land, which acreage includes a number of sub-stations.

"In consideration of these facts, we, the Experiment Station committee, respectfully submit the following resolution:

"That we strongly recommend that adequate funds be provided to enable our Experiment Station to start the investigations which are so badly needed, as shown by above list; and that the Experiment Station be provided with a large amount of additional land, including at least six sub-stations properly located so as to cover the problem of the entire State, and that funds be made available to properly maintain these sub-stations. We recommend this whole-heartedly and without reservation, because it is readily seen by the enormous amount of work being done with the meagre funds available that the money is being expended in a most judicious and careful manner, and we feel that if our Experiment Station is properly provided for in the way of funds, that it will render the service to the people which they demand, and which the Director and his staff have proven they are capable of rendering."

NEW PROJECTS WHICH SHOULD BE UNDERTAKEN

Again this committee said:

"The enormous number of new projects which should be undertaken, but which can not be started, due to lack of funds, and land on which to perform them, would make a very formidable list, but we take this occasion to list below the new projects which we believe should be undertaken, and which have been asked for most frequently by the farmers of the State:"

AGRONOMY

1. Occurrence, Nature, and Cause of Soil Acidity.
2. Chemical and Bio-Chemical Effects of Lime Applied to Soils.
3. The Influence of Soil Temperatures, Aeration, Reaction, and Composition of the Efficiency of Legume Inoculation.
4. Study of Losses Sustained by Soil Leaching and Erosion.

5. Plant Breeding for New Strains, Increased Yields, and for Climatic Adaption.
6. Effects of Lime and Fertilizer Treatment, and Best Crop Combinations for Pastures.
7. Effects of Fertilizers on the Quality and Shipping Capacity of Certain Crops.
8. Experiments in the Substitution of Leguminous Crops for Nitrogenous Fertilizers.
9. Plant Breeding for Disease and Nematode Resistance.

AGRICULTURAL ENGINEERING

10. Destructive Distillation of Fat Pine Stumps.
11. Farm Refrigeration.
12. Adoption of Machinery to our Conditions.
13. Syrup Making.
14. Land Clearing in Connection with Destructive Distillation.
15. Tractor Lug Project.
16. Syrup Manufacturing.
17. Sanitary Survey.

ANIMAL HUSBANDRY

18. Grazing Velvet Beans with Steers.
19. Wintering Breeding Cows.
21. Velvet Beans as a Feed for Hogs.
22. A Study of Factors Governing the Keeping Quality of Southern-made Cheese.
23. Removal of Bitterweed and Garlic Flowers from Dairy Products.

BOTANY AND PLANT PATHOLOGY

24. The Effects of Acids and other Electrolytes of the Absorption of Raw Materials and the Retention of Food Materials by the Roots of Plants.
25. The Life History of the Wild Onion.
26. Survey of Noxious and Poisonous Plants.
27. Protein Synthesis in the Cotton Plant.
28. Sweet Potato Diseases.
29. Cotton Diseases.
30. Honey Plants.

CHEMISTRY RESEARCH

31. To Determine the Nutritional Value of Certain Forage Crops which are Best Suited to our Conditions.
32. Poisonous Plant Investigation.
33. To Reduce to its Minimum the Injurious Results of Insects and to Combat Fungous and Bacterial Diseases of the Plants by the Application of Chemistry.
34. The Production of Cheap and Efficient Motor Fuel.
35. Increasing Sugar Contents of Sorghum.
36. To Find out the Deficiencies and Injurious Constituents of the Velvet Bean.

ENTOMOLOGY AND ZOOLOGY

37. Satsuma Orange Insects.
38. New Insecticide Materials.
39. The Life History and Methods of Control of the Mexican Bean Beetle.

HORTICULTURE

40. Variety and Fertilizer Studies of Common Garden Vegetables on the Eight Soil Types of Alabama.
41. Variety and Fertilizer Studies of Bush Trees, Fruits, Cultivated and Wild.
42. Variety, Tillage, and Pruning Investigations of Fruits and Nuts.
43. By-product Studies of Fruits.
44. A Chemical and Dietetic Study of Sweet Potatoes.
45. Forestry Studies.
46. Watermelon Investigations Covering Seed Selection, Fertilization, and Diseases.
47. Precoloring Satsumas.
48. Orchard Heating Experiments.
49. Satsuma Spraying Experiments, especially for the Control of Purple Scale, White Fly, Sour Scab, and Citrus Thrip.
50. Satsuma Fertilization.
51. Satsuma Bud Variation.
52. Satsuma Culture in General.
53. Pre-Cooling Satsumas.
54. Satsuma Cold Storage.
55. Cabbage Diseases, Fertilization, and Culture in General.
56. Cause why Peach Orchards in Southern Part of the State, which are Apparently in Fine Condition, Fail to Bloom.

"It is seen, therefore, that on account of limited funds those associated with the Experiment Station of Alabama are in fact leaving very many vital agricultural subjects untouched."

(Signed) DAN T. GRAY, *Director.*